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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/759,312	01/12/2001	Yoshihiro Ueta	299002051800	1784

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EXAMINER

MULPURI, SAVITRI

ART UNIT            PAPER NUMBER

2812

DATE MAILED: 11/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.  
09/759,312

Applicant(s)

Ueta et al

Examiner

Savitri Mulpuri

Art Unit

2812



-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

1)  Responsive to communication(s) filed on Sep 20, 2002

2a)  This action is FINAL. 2b)  This action is non-final.

3)  Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

4)  Claim(s) 1-11 is/are pending in the application.

4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5)  Claim(s) \_\_\_\_\_ is/are allowed.

6)  Claim(s) 1-11 is/are rejected.

7)  Claim(s) \_\_\_\_\_ is/are objected to.

8)  Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

9)  The specification is objected to by the Examiner.

10)  The drawing(s) filed on \_\_\_\_\_ is/are a)  accepted or b)  objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)  The proposed drawing correction filed on \_\_\_\_\_ is: a)  approved b)  disapproved by the Examiner. If approved, corrected drawings are required in reply to this Office action.

12)  The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

13)  Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)  All b)  Some\* c)  None of:

1.  Certified copies of the priority documents have been received.
2.  Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3.  Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\*See the attached detailed Office action for a list of the certified copies not received.

14)  Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a)  The translation of the foreign language provisional application has been received.

15)  Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

1)  Notice of References Cited (PTO-892)

2)  Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)  Information Disclosure Statement(s) (PTO-1449) Paper No(s). \_\_\_\_\_

4)  Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5)  Notice of Informal Patent Application (PTO-152)

6)  Other: \_\_\_\_\_

Art Unit: 2812

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kimura et al (US 6,201,823) in combination with Zauner et al and Yuge et al (US 6,030,848).

Kimura discloses a method of making a light emitting device by the following process steps: Providing a GaN substrate having crystal orientation, which is tilted from a direction (0001) face to (11-20) or (1-100) direction in an angle in the range of -5 to 5 degrees (see col. 6, lines 13-23); col. 9, line 15-31; col. 12, lines 30-41; col. 13, lines 20-36); and growing multi layers structure with active layer being multi quantum well active layer with seven period of alternating barrier and well layer "107" ; growing multiple layers including acceptor doping such as Mg p-type InAlGaN layer along with undoped and n-type doped InAlGaN layers (see col. 10-11).

Art Unit: 2812

Kimura does not disclose two limitations (1) homo-epitaxial growth i.e growing GaN on GaN substrate , (2) wait period subsequent to growth of well and barrier layer in time period in the range of 1 second to 60 minutes.

Zauner et al teaches growing GaN on GaN substrate as a homo-epitaxial growth at tilted angle of 0, 2 or 4 degrees to obtain GaN result the two orders of magnitude reduction density of grown hillocks as compared to homo-epitaxial films grown on(0001) direction or hetero-epitaxial growth such as growing GaN on sapphire (see abstract and page w 6 3.2 results and discussion). It would have been obvious to one of ordinary skill in the art to use homo-epitaxial growth with tilt angle 2 degrees tiled towards (11-20) in the invention of Kimura because of the advantage of reduction of the density of growth hillocks as taught in Zauner et al.

Yuge et al discloses a method of growing multiple GaN or AlGaN or InGaN layers. Yuge particularly teach annealing in the nitrogen rich carrier gas including hydrogen to produce damage free layer and thereby increase the efficiency of the light emitting device (see abstract and col. 4, lines 15-67). It would have been obvious to one of ordinary skill in the art at the time of invention made to anneal multiple layers in nitrogen rich carrier gas in the invention of Kimura to improve the efficiency of the device. Modified invention of Kimura as modified by the teaching of Yuge et al would have surface roughness less than the well layer in the quantum well structure because Yuge teaches surface roughness is decreased by annealing treatment in nitrogen rich atmosphere because nitrogen prevent sublimation or in other words replenish the nitrogen on the surface of the nitride compound semiconductors such as InGaN or GaAlInN etc.,

Art Unit: 2812

Applicant's arguments with respect to claims 8-11 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action.

Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Prior art teaches light emitting devices by using GaN or their tertiary quaternary compounds. Any inquiry concerning this communication or earlier communications from the examiner should be directed to S. Mulpuri whose telephone number is (703) 305-5184. The fax phone number for the organization where this application or proceeding is assigned is (703)308-7722 .

Application/Control Number: 09/759312

Page 5

Art Unit: 2812

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



SAVITRI MULPURI  
PRIMARY EXAMINER